

A MINIATURE QUADRUPOLE MASS SPECTROMETER ARRAY AND GC FOR SPACE FLIGHT: ASTRONAUT EVA AND CABIN-AIR MONITORING

**A. Chutjian¹, M. R. Darrach¹, V. Garkanian¹, D. Aalami², S. P. Jackson¹,
T. D. Molsberry¹, O. J. Orient¹, D. Karmon¹, and P. M. Holland³**

¹ Jet Propulsion Laboratory, Calif. Institute of Technology, Pasadena, CA 91109, USA

² Space Instruments, Inc., Irvine, CA 92618 USA

³ Thorleaf Research, Inc. Santa Barbara, CA 93111 USA

A miniature quadrupole mass spectrometer array [QMSA, see O. J. Orient *et al.* Rev. Sci. Instr. 68, 1393 (1997)] has been designed and built for NASA flight missions. These missions include detection, by astronauts in EVA, of N₂, O₂, and NH₃ leaks in the hull of the International Space Station, and of adsorbed hydrazines on the astronauts' suits. The fully-adapted system, with all software and visual readout, is called the Trace Gas Analyzer (TGA). When interfaced with a miniature gas chromatographic system, the QMSA will be useful for a variety of NASA missions involving more complex gas mixtures. The missions include planetary exploration (to Venus, Europa, Titan, *etc.*), as well as cabin-air monitoring for long-duration human flight to the Moon, Mars, and beyond. A description of the TGA system, and miniature GC front end will be given, and flight applications discussed.

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Email: ara.chutjian@jpl.nasa.gov

(818) 354-7012 (voice)

(818) 393-1899 (fax)